Effect of Different Amount of Silicon Carbide on SAC Solder-Cu Joint Performance by Using Microwave Hybrid Heating Method

Maliessa Nabilah Mazelan Siti Rabiatull Aisha Idris*

Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia.

Keywords: Soldering; microwave hybrid heating; intermetallic compound;

Abstract

Microwave hybrid heating (MHH) has been recognized for soldering process especially with lead-free solder alloy. This study seeks to investigates the effect of different amount of susceptor on the Sn-3.0Ag-0.5Cu-Copper (SAC305-Cu) joint performance by using MHH method. The susceptor material that was used to facilitate microwave heating in this study was Silicone Carbide (SiC). Different amount of SiC were used to compare its effect on the intermetallic compound (IMC) formed and shear strength at the solder joint. Domestic microwave with operating frequency 2.45GHz and 800W was used to join the solder and Cu substrate for 5, 6 and 7 minutes. Characterization of the samples were carried out using optical microscope, image analyzer and lap shear test. Microstructural study showed that scallop type structure of Cu_6Sn_5 was found at the SAC305/Cu interface after soldering with MHH technique. Thinnest Cu_6Sn5 IMC (14.909μm) were obtained by soldering with 6g of SiC for 6 minutes while highest shear strength were observed when 4g of SiC were used for soldering for 7 minutes (26.71 MPa).